Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A method of reducing the electrochemical corrosion potential of a component exposed to high temperature water in a hot water system in which the presence of at least one oxidizing species in the high temperature water raises the electrochemical corrosion potential of the component, the method comprising the steps of:

a) providing a reducing species to the high temperature water;

b) providing a plurality of catalytic nanoparticles, wherein the plurality of nanoparticles comprises at least one noble metal;

c) adding the plurality of catalytic nanoparticles to the high temperature water, wherein each of the catalytic nanoparticles provides a catalytic surface on which the reducing species reacts with the at least one oxidizing species present in the high temperature water; and

~~c~~d) reacting the reducing species with the at least one oxidizing species on the catalytic surface, thereby reducing the concentration of the at least one oxidizing species that is present within the high temperature water, wherein the electrochemical corrosion potential of the component is reduced.

2. (Original) The method of Claim 1, further including the step of forming a colloidal suspension of the plurality of catalytic nanoparticles in the high temperature water.

3. (Original) The method of Claim 2, wherein the step of reacting the reducing species with the at least one oxidizing species on the catalytic surface comprises

homogeneously catalyzing at least one reaction between the reducing species and the at least one oxidizing species present within the high temperature water on the catalytic surface of each of the plurality of catalytic nanoparticles.

4. (Original) The method of Claim 2, further including the step of depositing the plurality of catalytic nanoparticles in the colloidal suspension onto the component.

5. (Original) The method of Claim 4, wherein the step of reacting the reducing species with the at least one oxidizing species on the catalytic surface comprises the step of heterogeneously catalyzing at least one reaction between the reducing species and the at least one oxidizing species present within the high temperature water on the catalytic surface of each of the plurality of catalytic nanoparticles that are deposited on the component surface.

6. (Original) The method of Claim 1, wherein the at least one oxidizing species comprises one of oxygen, hydrogen peroxide, and hydroxyl radicals.

7. (Original) The method of Claim 1, wherein the reducing species is one of hydrogen, hydrazine, and ammonia.

8. (Original) The method of Claim 7, wherein the oxidizing species is oxygen and wherein the step of providing a reducing species to the high temperature water comprises dissolving a quantity of hydrogen gas in the high temperature water such that the ratio H2/O2 in the high temperature water has a value determined by weight of about 1:8.

9. (Original) The method of Claim 1, wherein the plurality of catalytic nanoparticles comprises at least one of palladium, platinum, osmium, ruthenium, rhodium, iridium, rhenium, oxides thereof, nitrides, thereof, borides thereof, phosphides thereof, and combinations thereof.

10. (Original) The method of Claim 9, wherein the plurality of catalytic nanoparticles comprises at least one of palladium, platinum, rhodium, and combinations thereof.

11. (Currently amended) The method of Claim 1, wherein the step of ~~providing a~~ <u>adding the</u> plurality of catalytic nanoparticles to the high temperature water comprises continuously delivering a predetermined amount of the plurality of catalytic nanoparticles to the high temperature water.

12. (Currently amended) The method of Claim 1, wherein the step of ~~providing a~~ <u>adding the</u> plurality of catalytic nanoparticles to the high temperature water comprises intermittently delivering a predetermined amount of the plurality of catalytic nanoparticles to the high temperature water at a predetermined time interval.

13. (Currently amended) The method of Claim 1, wherein the step of ~~providing a~~ <u>adding the</u> plurality of catalytic nanoparticles to the high temperature water comprises preparing a concentrated suspension of the plurality of catalytic nanoparticles in one of water, ethanol, methanol, and combinations thereof, and delivering the concentrated suspension to the high temperature water.

14. (Currently amended) The method of Claim 1, wherein the step of ~~providing a~~ <u>adding the</u> plurality of catalytic nanoparticles to the high temperature water further includes the steps of:

a) mixing the plurality of catalytic nanoparticles with at least one of a transition metal oxide powder and a transition metal powder to form a powder mixture; and

b) ~~providing~~<u>adding</u> the powder mixture to the high temperature water.

15. (Original) The method of Claim 14, wherein the transition metal oxide powder comprises at least one of zinc oxide and iron oxide.

16. (Original) The method of Claim 14, wherein the transition metal powder comprises at least one of zirconium, yttrium, iron, and zinc.

17. (Currently amended) The method of Claim 1, wherein the step of ~~providing a~~ adding the plurality of catalytic nanoparticles to the high temperature water comprises ~~providing~~adding the plurality of catalytic nanoparticles in a nondispersed metallic form to the high temperature water.

18. (Currently amended) The method of Claim 1, wherein the step of ~~providing a~~ adding the plurality of catalytic nanoparticles to the high temperature water comprises forming at least one shaped pellet containing the plurality of catalytic nanoparticles and ~~providing~~adding the at least one shaped pellet to the high temperature water.

19. (Currently amended) The method of Claim 1, wherein the step of ~~providing a~~ adding the plurality of catalytic nanoparticles to the high temperature water comprises coating at least one substrate with the plurality of catalytic nanoparticles to form at least one coated substrate, and ~~providing~~adding the at least one coated substrate to the high temperature water.

20. (Currently amended) The method of Claim 1, wherein the step of ~~providing a~~ adding the plurality of catalytic nanoparticles to the high temperature water comprises ~~providing~~adding a predetermined amount of the plurality of catalytic nanoparticles to the high temperature water that is sufficient to obtain a predetermined concentration of the plurality of catalytic nanoparticles in the high temperature water.

21. (Original) The method of Claim 20, wherein the predetermined concentration the plurality of catalytic nanoparticles is less than about 10 ppb.

22. (Original) The method of Claim 21, wherein the predetermined concentration the plurality of catalytic nanoparticles is between about 1 ppt and about 1 ppb.

23. (Original) The method of Claim 22, wherein the predetermined concentration of the plurality of catalytic nanoparticles is between about 10 ppt and about 1 ppb.

24. (Currently amended) The method of Claim 1, wherein the plurality of catalytic nanoparticles has a <u>mean</u> particle size of less than about 100 nm.

25. (Currently amended) The method of Claim 24, wherein the plurality of catalytic nanoparticles has a <u>mean</u> particle size of between about 5 nm and about 50 nm.

26. (Original) The method of Claim 1, wherein the plurality of catalytic nanoparticles has a surface area of between about 1 m^2/g and about 300 m^2/g.

27. (Original) The method of Claim 26, wherein the plurality of catalytic nanoparticles has a surface area of between about 10 m^2/g and about 100 m^2/g.

28. (Currently amended) A method of providing a plurality of noble metal nanoparticles for catalyzing the formation of water from hydrogen and oxygen present within high temperature water in a hot water system, the method comprising the ~~step~~<u>steps</u> of providing a plurality of noble metal nanoparticles<u> and adding the plurality of noble metal nanoparticles</u> to the high temperature water during operation of the hot water system, wherein the plurality of noble metal nanoparticles has a <u>mean</u> particle size of up to about 100 nm.

29. (Currently amended) The method of Claim 28, wherein the plurality of noble metal nanoparticles has a <u>mean</u> particle size of between about 5 nm and about 50 nm.

30. (Original) The method of Claim 28, wherein the plurality of noble metal nanoparticles has a surface area of between about 1 m^2/g and about 300 m^2/g.

31. (Original) The method of Claim 30, wherein the plurality of noble metal nanoparticles has a surface area of between about 10 m^2/g and about 100 m^2/g.

32. (Original) The method of Claim 28, wherein each of the plurality of noble metal nanoparticles comprises at least one of palladium, platinum, rhodium, and combinations thereof.

33. (Original) The method of Claim 32, wherein the hot water system is one of a nuclear reactor, a steam-driven turbine, and a water deaerator.

34. (Original) The method of Claim 32, wherein the hot water system is a nuclear reactor.

35. (Original) The method of Claim 34, wherein the nuclear reactor is a boiling water nuclear reactor.

36. (Original) The method of Claim 34, wherein the nuclear reactor is a pressurized water nuclear reactor.

37. (Currently amended) A method of reducing the electrochemical corrosion potential of a component exposed to high temperature water in a hot water system in which the presence of at least one oxidizing species in the high temperature water raises the electrochemical corrosion potential of the component, the method comprising the steps of:

a) providing a reducing species to the high temperature water;

b) providing a plurality of noble metal nanoparticles;

c) adding the plurality of noble metal nanoparticles to the high temperature water during operation of the hot water system, wherein each of the plurality of noble metal nanoparticles provides a catalytic surface on which the reducing species reacts with the at least one oxidizing species present in the high temperature water, and wherein the plurality of noble metal nanoparticles has a mean particle size of up to about 100 nm; and

~~c~~d) forming a colloidal suspension of the plurality of noble metal nanoparticles in the high-temperature water; and

~~d~~e) reacting the reducing species with the at least one oxidizing species on the catalytic surface thereby reducing the concentration of the at least one oxidizing species that is present within the high temperature water, wherein the electrochemical corrosion potential of the component is reduced.

38. (Original) The method of Claim 37, wherein the step of reacting the reducing species with the at least one oxidizing species on the catalytic surface comprises homogeneously catalyzing at least one reaction between the reducing species and the at least one oxidizing species present within the high temperature water on the catalytic surface of each of the plurality of noble metal nanoparticles.

39. (Original) The method of Claim 37, further including the step of depositing the plurality of noble metal nanoparticles in the colloidal suspension onto the component.

40. (Original) The method of Claim 39, wherein the step of reacting the reducing species with the at least one oxidizing species on the catalytic surface comprises the step of heterogeneously catalyzing at least one reaction between the reducing species and the at least one oxidizing species present within the high temperature water on the catalytic surface of each of the plurality of catalytic nanoparticles that are deposited on the component surface.

41. (Original) The method of Claim 37, wherein the at least one oxidizing species comprises at least one of oxygen, hydrogen peroxide, hydroxyl radicals, and combinations thereof.

42. (Original) The method of Claim 37, wherein the reducing species comprises at least one of hydrogen, hydrazine, ammonia, and combinations thereof.

43. (Original) The method of Claim 37, wherein the oxidizing species is oxygen and wherein the step of providing a reducing species to the high temperature water comprises dissolving a quantity of hydrogen gas in the high temperature water such that the ratio H_2/O_2 in the high temperature water has a value determined by weight of about 1:8.

44. (Original) The method of Claim 37, wherein each of the plurality of noble metal nanoparticles comprises at least one of palladium, platinum, osmium, ruthenium, rhodium, iridium, rhenium, and combinations thereof.

45. (Original) The method of Claim 44, wherein the plurality of noble metal nanoparticles comprises at least one of palladium, platinum, rhodium, and combinations thereof.

46. (Currently amended) The method of Claim 37, wherein the step of ~~providing a~~ adding the plurality of noble metal nanoparticles to the high temperature water comprises continuously delivering a predetermined amount of the plurality of noble metal nanoparticles to the high temperature water.

47. ((Currently amended) The method of Claim 37, wherein the step of ~~providing a~~ adding the plurality of noble metal nanoparticles to the high temperature water comprises intermittently delivering a predetermined amount of the plurality of noble metal nanoparticles to the high temperature water at a predetermined time interval.

48. (Currently amended) The method of Claim 37, wherein the step of ~~providing a~~ adding the plurality of noble metal nanoparticles to the high temperature water comprises preparing a concentrated suspension of the plurality of noble metal nanoparticles in one of water, ethanol, methanol, and combinations thereof, and ~~providing~~adding the concentrated suspension to the high temperature water.

49. (Currently amended) The method of Claim 37, wherein the step of ~~providing a~~ adding the plurality of noble metal nanoparticles to the high temperature water comprises:

a) mixing the plurality of noble metal nanoparticles with at least one of a transition metal oxide powder and a transition metal powder to form a mixture; and

b) ~~providing~~adding the powder mixture to the high temperature water.

50. (Original) The method of Claim 49, wherein the transition metal oxide powder comprises at least one of zinc oxide, and iron oxide.

51. (Original) The method of Claim 49, wherein the transition metal powder comprises at least one of zirconium, yttrium, iron, and zinc.

52. (Currently amended) The method of Claim 37, wherein the step of ~~providing a~~ adding the plurality of noble metal nanoparticles to the high temperature water comprises ~~providing~~adding the plurality of noble metal nanoparticles in an nondispersed metallic form to the high temperature water.

53. (Currently amended) The method of Claim 37, wherein the step of ~~providing a~~ adding the plurality of noble metal nanoparticles to the high temperature water comprises forming at least one shaped pellet containing the plurality of noble metal nanoparticles and ~~providing~~adding the at least one shaped pellet to the high temperature water.

54. (Currently amended) The method of Claim 37, wherein the step of ~~providing a~~ adding the plurality of noble metal nanoparticles to the high temperature water comprises coating at least one substrate with the plurality of noble metal nanoparticles to form at least one coated substrate, and ~~providing~~adding the at least one coated substrate to the high temperature water.

55. (Currently amended) The method of Claim 37, wherein the step of ~~providing a~~ adding the plurality of noble metal nanoparticles to the high temperature water comprises ~~providing~~adding a predetermined amount of the plurality of noble metal nanoparticles to the high temperature water that is sufficient to obtain a predetermined concentration of the plurality of noble metal nanoparticles in the high temperature water.

56. (Original) The method of Claim 55, wherein the predetermined concentration the plurality of catalytic nanoparticles is less than about 10 ppb.

57. (Original) The method of Claim 56, wherein the predetermined concentration the plurality of catalytic nanoparticles is between about 1 ppt and about 10 ppb.

58. (Original) The method of Claim 57, wherein the predetermined concentration of the plurality of catalytic nanoparticles is between about 10 ppt and about 1 ppb.

59. (Currently amended) The method of Claim 37, wherein the plurality of noble metal nanoparticles has a <u>mean</u> particle size of between about 5 nm and about 50 nm.

60. (Original) The method of Claim 37, wherein the plurality of noble metal nanoparticles has a surface area of between about 1 m^2/g and about 300 m^2/g.

61. (Original) The method of Claim 60, wherein the plurality of noble metal nanoparticles has a surface area of between about 10 m^2/g and about 100 m^2/g.

62. (Original) The method of Claim 37, wherein the hot water system is one of a nuclear reactor, a steam-driven turbine, and a water deaerator.

63. (Original) The method of Claim 62, wherein the hot water system is a nuclear reactor.

64. (Original) The method of Claim 63, wherein the nuclear reactor is a boiling water nuclear reactor.

65. (Original) The method of Claim 63, wherein the nuclear reactor is a pressurized water nuclear reactor.

66. (Currently amended) A method of reducing the electrochemical corrosion potential of a component exposed to high temperature water in a nuclear reactor in which the presence of at least one oxidizing species in the high temperature water raises the electrochemical corrosion potential of the component, the method comprising the steps of:

a) providing a reducing species to the high temperature water;

b) providing a plurality of noble metal nanoparticles;

c) adding the plurality of noble metal nanoparticles to the high temperature water within the nuclear reactor, wherein each of the plurality of noble metal nanoparticles provides a catalytic surface on which the reducing species reacts with the at least one oxidizing species present in the high temperature water, and wherein the plurality of noble metal nanoparticles has a mean particle size of up to about 100 nm;

~~c~~d) forming a colloidal suspension of the plurality of noble metal nanoparticles in the high temperature water; and

~~d~~e) reacting the reducing species with the at least one oxidizing species on the catalytic surface thereby reducing the concentration of the at least one oxidizing species that is present within the high temperature water, wherein the electrochemical corrosion potential of the component is reduced.

67. (Currently amended) The method of Claim 66, wherein the step of ~~providing a~~ adding the plurality of noble metal nanoparticles to the high temperature water within the nuclear reactor comprises ~~providing~~adding the plurality of noble metal nanoparticles to the high temperature water during operation of the nuclear reactor.

68. (Currently amended) The method of Claim 66, wherein the step of ~~providing a~~ adding the plurality of noble metal nanoparticles to the high temperature water within the nuclear reactor comprises ~~providing~~adding the plurality of noble metal

nanoparticles to the high temperature water during one of cool down, outage, hot standby, or low power operation of the nuclear reactor.

69. (Currently amended) The method of Claim 66, wherein the step of ~~providing a~~ adding the plurality of noble metal nanoparticles to the high temperature water within the nuclear reactor comprises ~~providing~~adding the plurality of noble metal nanoparticles to the high temperature water through one of residual heat removal piping, recirculation piping, a feedwater line, a core delta P line, a jet pump instrumentation line, control rod drive cooling water lines, water level control points, and reactor water cleanup system of the nuclear reactor.

70. (Original) The method of Claim 66, wherein the high temperature water has a temperature of between about 50°C and about 320°C.

71. (Original) The method of Claim 70, wherein the high temperature water has a temperature of between about 50°C and about 290°C.

72. (Original) The method of Claim 66, wherein the nuclear reactor is a boiling water nuclear reactor.

73. (Original) The method of Claim 66, wherein the nuclear reactor is a pressurized nuclear reactor.

74. (Original) The method of Claim 66, wherein the plurality of noble metal nanoparticles comprises at least one of palladium, platinum, osmium, ruthenium, rhodium, iridium, rhenium, and combinations thereof.

75. (Original) The method of Claim 74, wherein the plurality of noble metal nanoparticles comprises at least one of palladium, platinum, rhodium, and combinations thereof.

76. (Currently amended) A system for reducing the electrochemical corrosion potential of a component exposed to high temperature water in a hot water system,

wherein the presence of at least one oxidizing species in the high temperature water raises the electrochemical corrosion potential of the component, the system comprising:

a) a reducing species, the reducing species being deliverable to the high temperature water; and

b) a plurality of catalytic nanoparticles, the plurality of catalytic nanoparticles having a mean particle size of up to about 100 nm, wherein each of the plurality of catalytic nanoparticles comprises at least one noble metal and provides a catalytic surface on which the reducing species reacts with the at least one oxidizing species present in the high temperature water; and wherein the plurality of catalytic nanoparticles is deliverable to the high temperature water,

wherein the reducing species reacts with the at least one oxidizing species on the catalytic surface, thereby reducing the concentration of the at least one oxidizing species that is present within the high temperature water, thereby reducing the electrochemical corrosion potential of the component.

77. (Original) The system of Claim 76, wherein the at least one oxidizing species comprises at least one of oxygen, hydrogen peroxide, and hydroxyl radicals.

78. (Original) The system of Claim 76, wherein the reducing species is one of hydrogen, hydrazine, and ammonia.

79. (Original) The system of Claim 78, wherein the oxidizing species is oxygen and wherein the ~~step of providing a~~ reducing species is delivered to the high temperature water ~~comprises~~ by dissolving a quantity of hydrogen gas in the high temperature water such that the ratio H_2/O_2 in the high temperature water has a value determined by weight of about 1:8.

80. (Currently amended) The ~~method~~ system of Claim 76, wherein the plurality of catalytic nanoparticles comprises at least one of palladium, platinum,

osmium, ruthenium, rhodium, iridium, rhenium, oxides thereof, nitrides, thereof, borides thereof, phosphides thereof, and combinations thereof.

81. (Currently amended) The ~~method~~ system of Claim 80, wherein the plurality of catalytic nanoparticles comprises at least one of palladium, platinum, rhodium, and combinations thereof.

82. (Currently amended) The ~~method~~ system of Claim 76, wherein the plurality of noble metal nanoparticles has a mean particle size of between about 5 nm and about 50 nm.

83. (Currently amended) The ~~method~~ system of Claim 76, wherein the plurality of noble metal nanoparticles has a surface area of between about 1 m^2/g and about 300 m^2/g.

84. (Currently amended) The ~~method~~ system of Claim 83, wherein the plurality of noble metal nanoparticles has a surface area of between about 10 m^2/g and about 100 m^2/g.

85. (Original) The system of Claim 76, wherein the hot water system is one of a nuclear reactor, a steam-driven turbine, and a water deaerator.

86. (Original) The system of Claim 85, wherein the hot water system is a nuclear reactor.

87. (Original) The system of Claim 86, wherein the nuclear reactor is a boiling water nuclear reactor.

88. (Original) The system of Claim 86, wherein the nuclear reactor is a pressurized water nuclear reactor.

89. (Original) The system of Claim 76, wherein the plurality of catalytic nanoparticles is deliverable to the high temperature water through one of residual heat removal piping, recirculation piping, a feedwater line, a core delta P line, a jet pump

instrumentation line, control rod drive cooling water lines, water level control points, and reactor water cleanup system of the nuclear reactor.

90. (Original) The system of Claim 76, wherein the plurality of catalytic nanoparticles is deliverable in a predetermined amount to the high temperature water.

91. (Original) The system of Claim 90, wherein the plurality of catalytic nanoparticles is intermittently deliverable in a predetermined amount to the high temperature water at a predetermined time interval.

92. (Original) The system of Claim 76, wherein the plurality of catalytic nanoparticles is deliverable as a concentrated suspension of the plurality of catalytic nanoparticles in one of water, ethanol, methanol, and combinations thereof, wherein the concentrated suspension is introduced into the high temperature water.

93. (Original) The system of Claim 76, wherein the plurality of catalytic nanoparticles is deliverable as a mixture of the plurality of catalytic nanoparticles with at least one of a transition metal oxide powder and a transition metal powder to form a powder mixture, wherein the powder mixture is introduced into the high temperature water.

94. (Original) The system of Claim 93, wherein the transition metal oxide powder comprises at least one of zinc oxide and iron oxide.

95. (Original) The system of Claim 93, wherein the transition metal comprises at least one of zirconium, iron, yttrium, and zinc.

96. (Original) The system of Claim 76, wherein the plurality of catalytic nanoparticles is deliverable in a nondispersed metallic form, wherein the nondispersed metallic form is introduced into the high temperature water.

97. (Original) The system of Claim 76, wherein the plurality of catalytic nanoparticles is deliverable as at least one shaped pellet containing the plurality of

catalytic nanoparticles, wherein the at least one shaped pellet is introduced into the high temperature water.

98. (Currently amended) 98. The system of Claim 76, wherein the plurality of catalytic nanoparticles is deliverable as at least one substrate coated with the plurality of catalytic nanoparticles to form at least one coated substrate, wherein the at least one coated substrate is introduced into the high temperature water.